En

Operating instructions and spare parts list

ZA05
Reciprocator

Translation of the original operating instructions

Gema

Reciprocator documentation ZA05

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General safety regulations

This chapter sets out the fundamental safety regulations that must be followed by the user and third parties using the ZA05 Reciprocator.

These safety regulations must be read and understood before the ZA05 Reciprocator is put into operation.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

DANGER!
Danger due to electrically live or moving parts. Possible consequences: death or serious injury

WARNING!
Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

INFORMATION!
Useful tips and other information

Conformity of use

1. The ZA05 Reciprocator is built to the latest specification and conforms to the recognized technical safety regulations and is designed for the normal application of powder coating.
2. Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions. Gema Switzerland GmbH must be consulted prior to any use of the ZA05 Reciprocator for any purposes or substances other than those indicated in our guidelines.
3. Observance of the operating, service and maintenance instructions specified by the manufacturer is also part of conformity of use. The ZA05 reciprocator should only be used,

maintained and started up by trained personnel, who are informed about and are familiar with the possible hazards involved.

4. Start-up (i.e. the execution of a particular operation) is forbidden until it has been established that the ZA05 Reciprocator has been set up and wired according to the guidelines for machinery (2006/42 EC). EN 60204-1 (machine safety) must also be observed.
5. Unauthorized modifications to the ZA05 Reciprocator exempt the manufacturer from any liability from resulting damage.
6. The relevant accident prevention regulations, as well as other generally recognized safety regulations, occupational health and structural regulations are to be observed.
7. Furthermore, the country-specific safety regulations also must be observed.

Explosion protection	Protection type
CE Ex II 3D	IP54

A summary of the directives and standards

European directives

2006/42/EC	Machinery
94/9/EC	Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres
2004/108/EC	Electromagnetic Compatibility (EMC)

European standards

EN ISO 12100-1 2004	Safety of Machinery – Basic Concepts, General Principles for Design –Part 1: Basic Terminology, Methodology
EN ISO 12100-2 2004	Safety of Machinery – Basic Concepts, General Principles for Design – Part 2: Technical Principles
EN ISO 14121-1 2007	Safety of Machinery – Risk Assessment, Part 1: Principles
EN 60204-1 2006	Safety of Machinery – Electrical Equipment of Machines – Part 1: General requirements
EN 13980:2002	Potentially Explosive Atmospheres – Application of Quality Systems
ISO 9001 2008	Quality Management Systems – Requirements
EN 61241-0:2006	Electrical Apparatus for Use in the Presence of Combustible Dust. General requirements
EN 61241-2-2 1995	Electrical Apparatus for Use in the Presence of Combustible Dust. Part 2: Methods

EN 61241-10 2004	Electrical Apparatus for Use in the Presence of Combustible Dust. Part 10: Classification of Areas Where Combustible Dusts Are or May Be Present
EN 1127-1:2008	Explosive Atmospheres. Basic Concepts and Methodology

Product-specific safety measures

ZA05 Reciprocator

The ZA05 Reciprocator is a constituent part of the system and is thus integrated into the safety system of the plant.

If it is to be used in a manner outside the scope of the safety concept, then corresponding measures must be taken.

Note:
For further information, see the more detailed Gema safety regulations!

Special safety regulations for the ZA05 Reciprocator

1. The ZA05 Reciprocator may only be switched on and operated after careful reading of this manual. Incorrect operation of the axes control unit can lead to accidents, malfunctions or damage to the plant.
2. **Attention, the power of the reciprocator is very much stronger than that of a human being!** All axes must be secured against access during operation (see local regulations).**Never stand under the Z carriage when the vertical axis is not operating!**
3. The plugs and sockets of the axes control unit and the power unit of the ZA05 Reciprocator should only be unplugged when the power supply is disconnected
4. The connecting cables between the control unit and the reciprocator must be laid in such a way, that they cannot be damaged during axes operation. Please observe the local safety regulations!
5. The **maximum upper stroke limit** of the reciprocator must always be set with reference to the **maximum height of the booth gun slots**. If an incorrect (too high) stroke limit is set, this can lead to damage to the reciprocator and/or the booth!

Warning:
During a test run, it must be guaranteed that the unit is not damaged by the test! In particular, the limitations of the stroke range have to be observed (for further information, see chapter "Setting the upper mechanical stop")!

6. When repairing the reciprocator, both the reciprocator control unit and the reciprocator must be disconnected from the mains according to the local safety regulations!
7. Repairs may be done only by authorized Gema service centers. Unauthorized conversions and modifications can lead to injuries and damage to the equipment. The Gema Switzerland GmbH guarantee would no longer be valid.
8. Only original Gema spare parts should be used! The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!
9. We point out that the customer himself is responsible for the safe operation of the equipment. Gema Switzerland GmbH is in no way responsible for any resulting damage.

About this manual

General information

This operating manual contains all the important information you require for the working with the ZA05 Reciprocator. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - booth, gun control unit, manual gun or powder injector - should be referenced to their corresponding documents.

Function description

Field of application

The ZA05 Reciprocator was designed for automatic coating with powder applicators. It is used as the basis for all stages of automation, from a simple vertical stroke to complex, multi-dimensional processes.

Depending on the design of the applicators, this unit may be used with all types of powder coating.

Any other use is considered non-compliant. The manufacturer shall not be liable for damage resulting from such use; the user bears sole responsibility for such actions.

Function

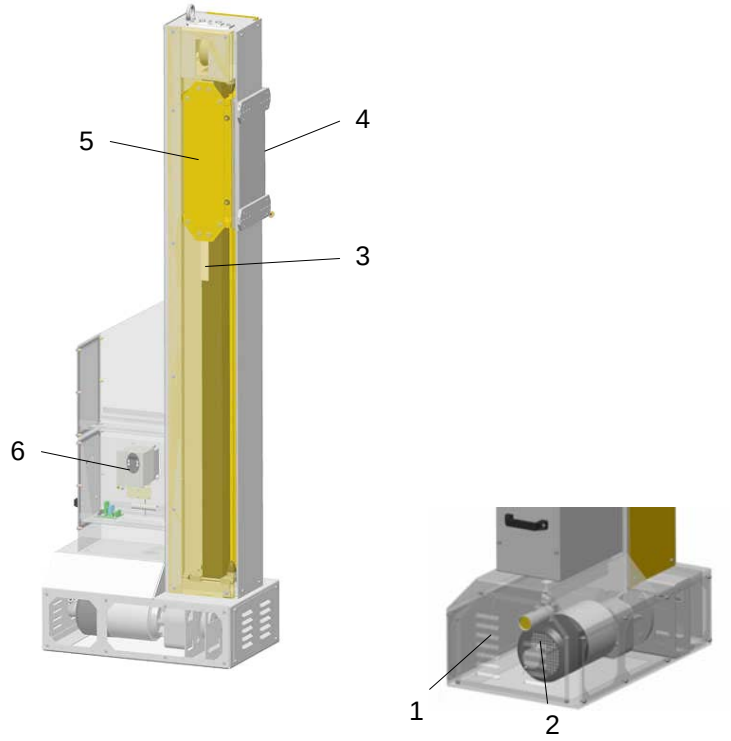
The reciprocator carries out a linear, oscillating up-and-down motion in the vertical direction (called Z motion). The movement sequences (stroke and stroke speed) are controlled by the reciprocator control unit.

The gun holders are fitted on the shield (**4**) of the Z carriage (**5**). The Z carriage (**5**) is moved up and down on the central column by a drive belt (**3**) inside the reciprocator. This vertical column serves also as a runway for the rollers. The drive unit (**2**) and the electrical connection are installed in the reciprocator base (**1**). An incremental pulse generator, which is installed in the motor case, enables the exact positioning of the Z carriage.

The power unit (**6**) as well as the corresponding wiring are housed in an electronics module, which is plugged into the axis. One module is needed for each axis. Empty space is available for additional axes (e.g. X axis).

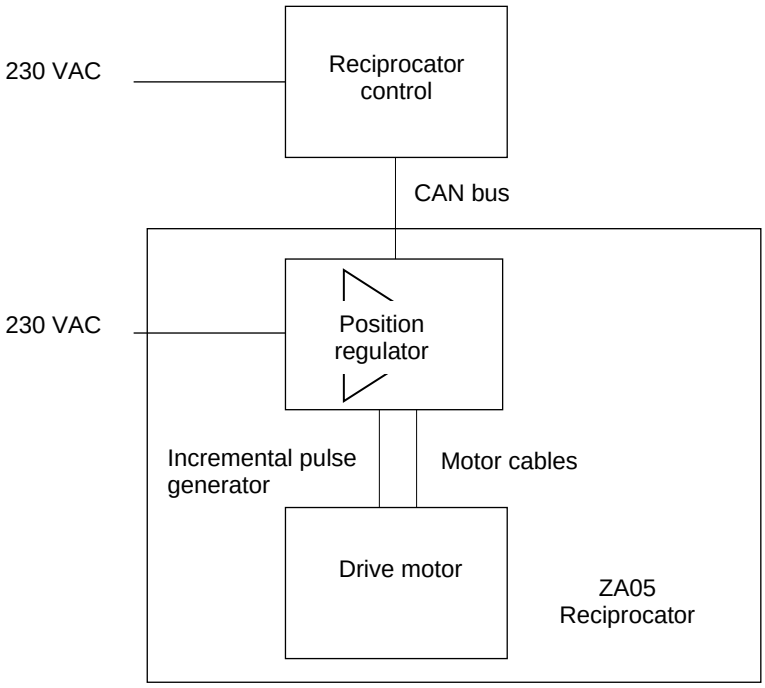
If the power is interrupted, the motion of the Z carriage is stopped momentarily with the holding brake built into the drive unit. The holding brake can be activated manually during maintenance or in an emergency.

To ensure that the reciprocator cannot become a hazard during normal operation, the axes are shielded by a protective fence that is 2.3 m high. The fence has doors that are released by the control unit to allow authorized technical personnel access to the axes.



ZA05 Reciprocator - vertical cross-section

Schematic presentation



Schematic presentation

Special characteristics

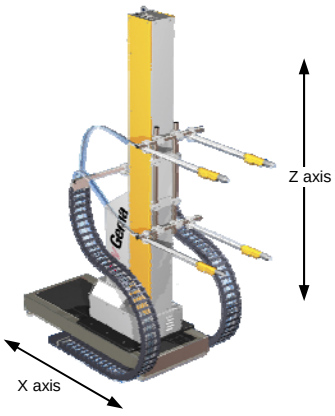
The ZA05 Reciprocator is conspicuous because of its rugged construction, a new drive system and an improved Z axis carriage design.

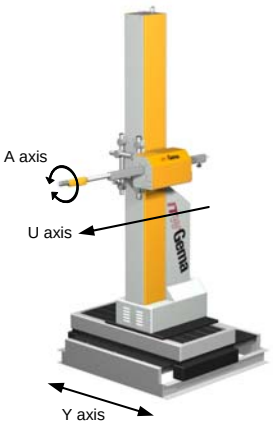
Further characteristics:

- 50 kg load capacity for automatic gun and gun holders
- Built-in holding brake
- Quiet running
- High speed, maximum acceleration and braking action
- Safe operation and simple maintenance
- High efficiency due to low energy consumption
- Designed for continuous operation
- Mobile version available
- IP54 protection type
- 4 standard stroke heights available: 1.3 m / 1.8 m / 2.3 m / 2.8 m
- Intermediate and larger sizes available in steps of 250 mm

Expansion with additional axes of motion

The ZA05 Reciprocator can be equipped with additional axes to expand its functionality.





Reasonably foreseeable misuse

- Operation in rooms with gases
- Incorrect setting of the mechanical stroke limiters
- Incorrect programming of the upper and lower turning points
- Loading the Z carriage with more than 50 kg
- Operation without the proper training
- Operating the reciprocator without the protective fence

Technical data

ZA05 Reciprocator

Versions

The ZA05 Reciprocator is available, depending on operational area, in four versions with different standard stroke heights.

	ZA05-13	ZA05-18	ZA05-23	ZA05-28
Reciprocator height - H	2.385 m	2.885 m	3.385 m	3.885 m
Stroke length	up to 1.3 m	up to 1.8 m	up to 2.3 m	up to 2.8 m
Weight	195 kg	220 kg	240 kg	261 kg
Stroke speed	0.01 up to 0.6 m/s			
Acceleration	0.1 - 2.0 m/s²			
Position detection	with incremental pulse generator			
Max. lifting weight	max. 50 kg on the Z carriage			

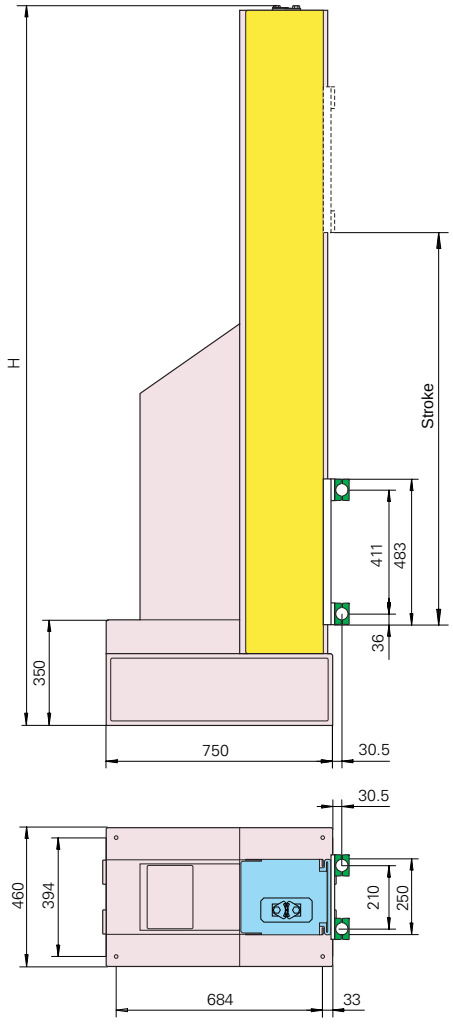
Electrical data

ZA05	
Power supply	230 VAC (from control unit)
Tolerance	± 10%
Power consumption	1.1 kW
Frequency	50/60 Hz
Protection type	IP54
Isolation	Class F
Control unit	CM-30
Temperature range	10°C - 40°C (50°F - 104°F)

Drive unit data

ZA05	
Drive unit	Motor/gearbox unit
Performance	0.75 kW
Motor voltage/frequency	230 VAC, 87 Hz
Electrical wiring	Triangle/three phase
Motor speed	2450 rpm
Drive torque	80 Nm
Brake torque	10 Nm
Lubricant type	Shell Omala 220
Lubricant quantity	0.25 liters

Dimensions



ZA05 Reciprocator - Dimensions

Set-up, assembly and commissioning

Warning:
If a free-standing reciprocator is not anchored firmly to the floor, uncontrolled movement of the machine or insufficient stability can cause injuries.

- Firmly anchor the reciprocator to the floor if it is not mounted to another axis of motion

Warning:
The movement of the reciprocator can cause injuries.

- Erect a protective fence around the reciprocator so that there is no danger of injury during normal operation.

Danger:
Injuries can occur when inside the protective fence due to the movement of the reciprocator.

- In order to enter the inner area, the door interlocks must be released by the control unit. This release signal may only be activated by technical personnel.

Except for normal operation, all other operating modes must be set up by an authorized technical representative.

Start-up

Preparation for start-up

Warning:
Before connecting or switching on the reciprocator, carefully read these operating instructions! Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit!

(see the user manual of the reciprocator control unit)

General information

Warning:
Before start-up work is done, make certain that nobody can switch on the reciprocator! Switch off and lock the mains switch!

Before starting up, the following checks should be done:

- Check the gun holder and hose holder if they are firmly fitted. Mount the gun holder in such a way that they do not hit the bottom of the booth slots on start-up and cause damage
- Lay out the cables and hoses in such a way that even at the highest stroke no strain can arise
- Check the grounding of the guns and hose carriers
- Check if the upper and the lower reversing point of the Z carriage are set correctly. The stroke length of the reciprocator must be in the range of the booth opening (collision danger!)
- Make sure that the automatic guns cannot collide with the work pieces (incorrectly adjusted stroke parameters on the reciprocator control unit)

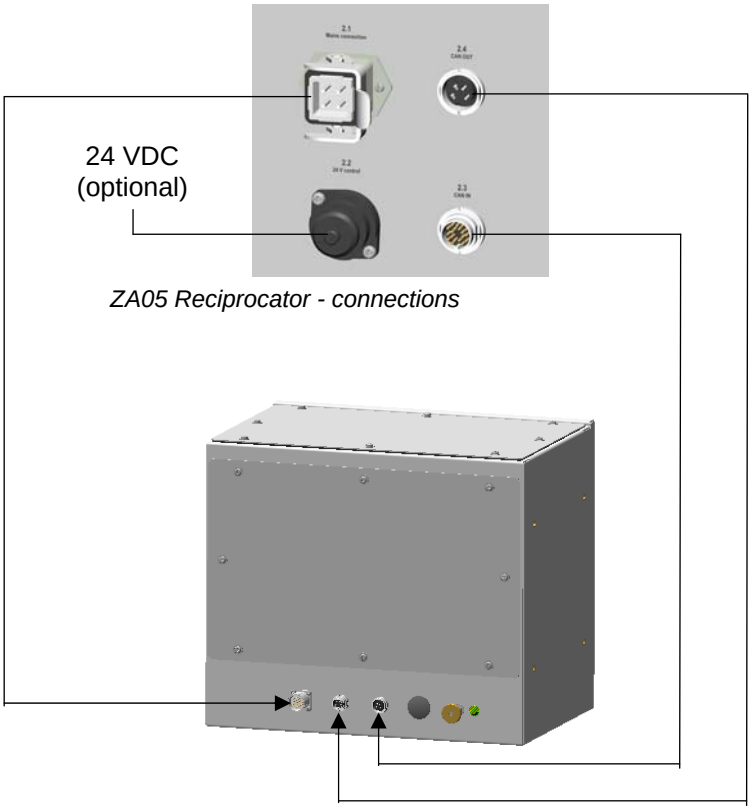
Reference point

At every start-up after the mains have been interrupted, the reference point of the reciprocator must be referred again (see "Reference point and mechanical stops"). After the reference point is reached, the reciprocator begins to carry out the movements set on the reciprocator control unit.

Before the reciprocator is put into operation, the upper stroke limit must be set on the reciprocator control unit (see therefore the corresponding reciprocator control unit operating manual)!

Warning:
Incorrect setting of the upper and lower stroke limits can cause damages to the reciprocator, to the booth and/or to the applicators!

Electrical connections / cable connections



ZA05 Reciprocator - connections

CM-30 control - connections

- As an option, the connection **2.2 (24 V control)** may be tied into a constant 24 VDC source so that in event of an interruption of power to the reciprocator the reference point remains in memory, i.e. after rewiring the power feed it is not necessary to reference the axes again.

Checkpoints before switching on

Before switching on, the following checks should be done:

- Check if the cables and hoses are laid out correctly
- Check if the guns have a clear run and do not touch the booth slots
- Check the distance between the work pieces and the guns

Warning:
Before connecting or switching on the reciprocator, read carefully these operating instructions!

Grounding / protection type

All metal parts of the reciprocator must be grounded according to the local safety regulations. The gun holders must be connected to the grounding screw on the reciprocator base by the grounding strip.

All electrical installations are implemented in accordance to VDE IP54 protection type regulations!

Hoses and cables

All movable hoses and cables must be laid out in such a way that they are neither subjected to any loads nor can hang on other parts. The electric cables of the reciprocators must be protected from mechanical damage.

Reference point and mechanical stops

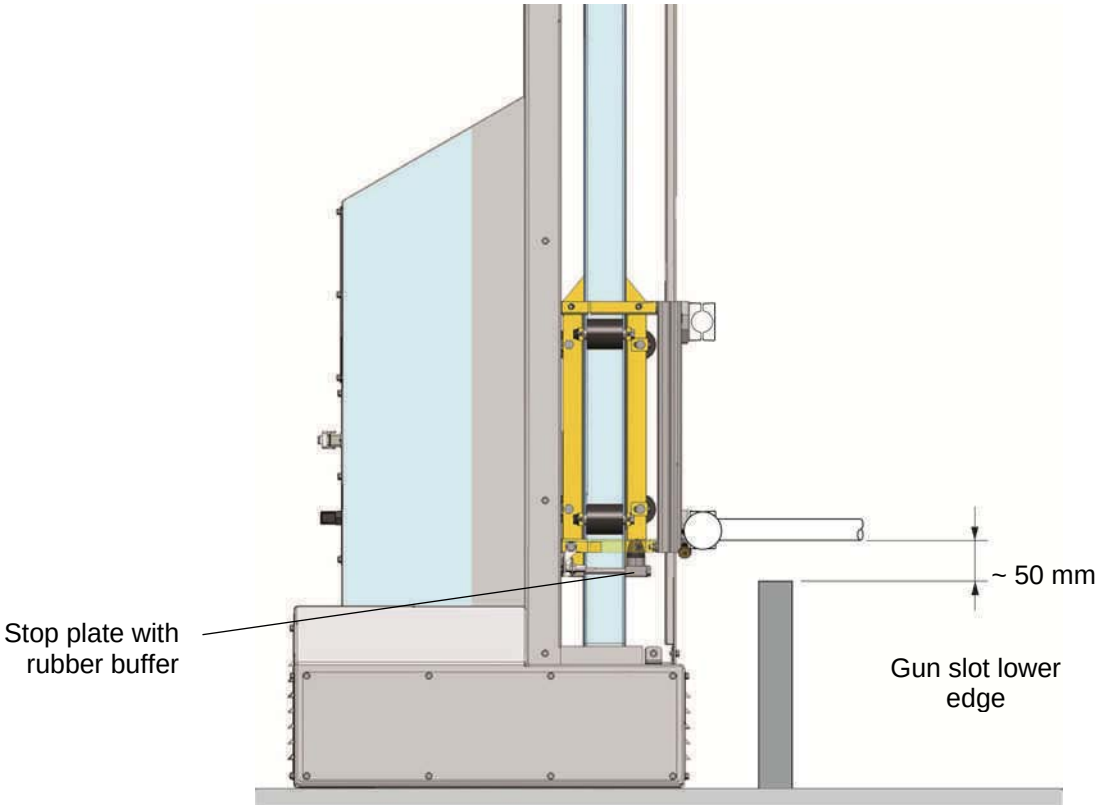
The reference point serves as starting point for the reciprocator control unit for calculating the upper and lower reversing point and the maximum stroke.

Each time the reciprocator is switched on, the control unit requests that the Z carriage travels to the reference point (zero point). The Z carriage travels to the lowest mechanical stop, that means onto the rubber buffer and remains in this end position on the compressed buffer.

The control unit notes this and gives the distance how far the carriage must travel from this position to decompress the rubber buffer. The standard value for the Z axis is 25, that means 25 mm upwards away from the mechanical stop. For this reason, the Reciprocator control unit must be programmed in such a way that the reference point is always 25 mm above the lowest mechanical stop (zero point).

For transport reasons, the ZA05 Reciprocator is delivered with the rubber buffer and the carriage in lowest position.

Attention!
In order to avoid damages to the booth, to the gun holders etc. the reference point must be set before the first start-up!



ZA05 reciprocator - reference point and mechanical stops

Warning:
In order to avoid damages to the booth or the gun holders, the reference point must be checked before the first start-up and if necessary, reset! It must be noted that the axes in reference travel moves up to 25 mm below the control's zero point, therefore the mechanical stop must be set in accordance to the gun slots!

The position of the upper and the lower stop plate is set by an Gema service engineer when the reciprocator is assembled.

Warning:
The reference point must be referenced before each start-up (at each switching on, after an interruption of the power supply etc.)!

Setting the lower mechanical stop

Warning:
The setting of the lower mechanical stop must take place without load and the reciprocator must be disconnected from mains!

Procedure:

1. Release the brake switch manually
2. Let the Z carriage sink down until the powder gun holder is approximately 50 mm above edge of the gun slot
3. Remove the boarding/side panels
4. Loosen the screws and move the lower stop plate up to the Z carriage
5. Tighten the screws
6. Refit the boarding/side panels

Setting the upper mechanical stop

Warning:
The setting of the upper mechanical stop must take place without load and the reciprocator must be disconnected from mains!

In order to set the upper mechanical stop, the stop position hast to be measured - for this reason, consider the maximum height of the booth gun slots!

Warning:
An incorrect (too high) set stroke limit can lead to damage to the reciprocator and/or the booth!

Procedure:

1. Remove the boarding/side panels
2. Loosen the screws and move the upper stop plate up to the measured position
3. Tighten the screws
4. Refit the boarding/side panels

Warning:
After the adjustment of the mechanical stops, the system parameter for the upper stop must be checked on the reciprocator control unit! The value must not be larger than the maximum stroke possible between the stops!

Maintenance

Danger:
Injuries can occur when inside the protective fence due to the movement of the reciprocator.- In order to enter the inner area, the door interlocks must be released by the control unit. This release signal may only be activated by technical personnel.

General information

Warning:
Before maintenance work can be carried out on the reciprocator, it must be ensured that the reciprocator cannot be turned on by third parties! The reciprocator has to be free of load and disconnected from mains!

The ZA05 Reciprocator was designed to operate with a minimum of maintenance. The motor gear box is self-lubricating and maintenance-free.

Regular maintenance and inspection of the reciprocator increases the working reliability and avoids damages, repair downtimes etc.!

Maintenance schedule

Note:
The following maintenance schedule is based on operation of 8 hours per day.

Time interval	Maintenance work
weekly	- Blow off the outside of the reciprocator with compressed air or clean it with a soft cloth from top to bottom at least once a week.
monthly	- Check the drive unit gearbox for oil loss - Check the motor case in the reciprocator base for deposits of powder dust and if present, clean it
every 6 months	- Check the drive belts for wear and tension - Check the rollers on the Z carriage for free movement and wear - Check the column for wear and deposits and, if present, clean it

Note:
The parts which are to be replaced during maintenance work are available as spare parts. Please refer to the spare parts list too!

Drive unit

Danger:
During assembly, cleaning, maintenance and commissioning when close to energized components, an electrical shock can cause serious injury or death.

- All work must be carried out only by technical personnel and when no power is applied!

- The reciprocator must not have any load!

The motor gear box is self-lubricating and maintenance-free.

Observe the contamination of the enclosure - strong contamination on the outside can increase the operating temperature of the drive unit!

Therefore, clean the drive unit from time to time (with a vacuum cleaner etc.). Check the drive unit gearbox monthly for oil loss. If the drive unit gearbox has to be changed for any reason, the complete unit has to be replaced!

Warning:
For safety reasons, two people should always carry out the following maintenance work!

Replacing the drive unit

Warning!
There is the risk of burns if contact is made with electrical components that have become overheated!

- All work must be carried out only by technical personnel and when no power is applied!

If it is necessary to replace a drive unit gearbox, the complete motor unit must be dismantled from the reciprocator base. Therefore, the reciprocator has to be free of load and disconnected from mains.

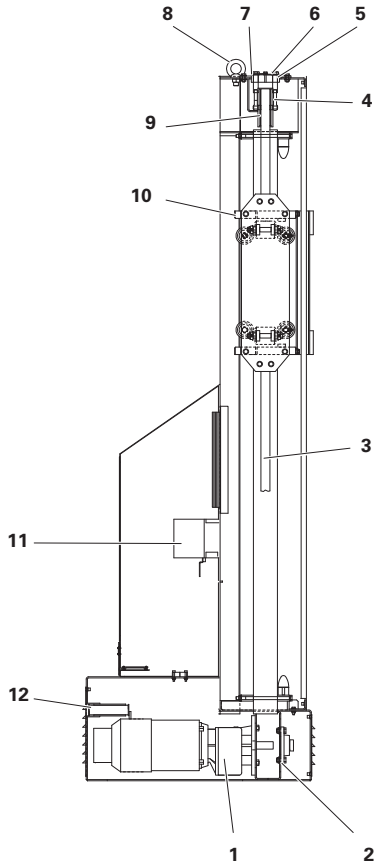
Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Remove all cover plates from the reciprocator
3. Remove the locking plates (**7**) and loosen the tensioning screws, so that the drive belt (**3**) is slack
4. Loosen the lower clamp plate with the drive belt on the Z carriage (**10**) and set it down. Note the position of the clamp plate on the drive belt holder, because it must be fitted in approximately the same position on assembly
5. Loosen the grub screw on the clamp ring in front of the flange bearing (**2**)
6. Use an appropriate iron rod (from the side, in the hole of the clamp ring) and release the clamp ring from the motor spindle (counter-clockwise)with a hammer
7. Remove the clamp ring, but do not remove the flange bearing (**2**)!

ZA05 Reciprocator - flange bearing

8. If the grub screw or the hole is not accessible, release the brake manually and turn the drive wheel by hand on an appropriate position
9. Release the clamping bracket and pull out the connector
10. Uncouple the cable to the incremental pulse generator (encoder) from connection X8 (see the schematic diagram) and pull the plug through the cable gland into the motor case
11. Support the back of the motor in such a way it remains balanced and does not tilt backwards, when the motor flange screws are loosen
12. Remove the screws and carefully remove the motor from the rear of the reciprocator base

The installation takes place exactly in the reverse order!



ZA05 Reciprocator

Drive belt

Warning:
Injuries can arise if fingers, hair or articles of clothing get caught between the drive belt and the drive wheel or toothed wheel.

- All work must be carried out only by technical personnel

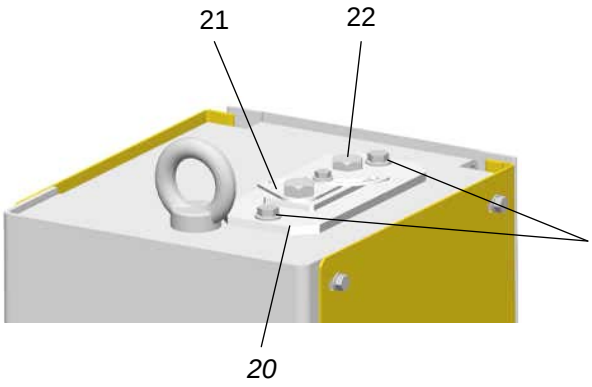
The drive belt (**3**) should be checked regularly because it is exposed to large loads when in operation:

- The drive belt (**3**) should be checked for wear and tension every 6 months. Powder deposits should be removed with a vacuum cleaner, because this can influence the quiet running and shorten the service life of the drive belt
- Switch on the reciprocator and check the Z carriage (**10**) for quiet running. Check the drive belt (**3**) for elongation or wear (noisy running, strong vibration of the belt when reversing the direction of travel)

Warning:
For safety reasons, two people should always carry out the following maintenance work!

Tensioning the drive belt

- Remove the locking plates (**21**)
- Tighten the drive belt evenly with the tensioning screws (**22**)
- The guide plate (**20**) must not be unscrewed for any reason - **factory setting**!



ZA05 Reciprocator - top view

Replace the drive belt

Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (side panels)
4. Remove the locking plates (**21**) and loosen the tensioning screws, so that the drive belt (**3**) is slack
5. Loosen the lower clamp plate with the drive belt on the Z carriage (**10**) and set it down. Note the position of the clamp plate on the drive belt holder, because it must be fitted in approximately the same position on assembly
6. Remove the damaged drive belt from the reciprocator column
7. Loosen the screws on the upper clamp plate and remove the drive belt when it is completely outside of the reciprocator
8. Screw on the new drive belt at the upper clamp plate
9. Pass the loose end of the drive belt over the upper toothed drive wheel from inside the reciprocator column
10. Screw on the drive belt at the lower clamp plate
11. Tension the drive belt, but do not overstretch (see chapter "Tensioning the drive belt")

Drive wheel

Replacing the upper toothed drive wheel

Warning:
The following workings should only be carried out by trained personnel!

Procedure:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (side panels)
4. Remove the locking plates (**21**) and loosen the tensioning screws, so that the drive belt (**3**) is slack
5. Completely remove the front tensioning screw

Attention, danger of accident!
The Z carriage must definitely rest on the rubber buffer before this tensioning screw is removed!

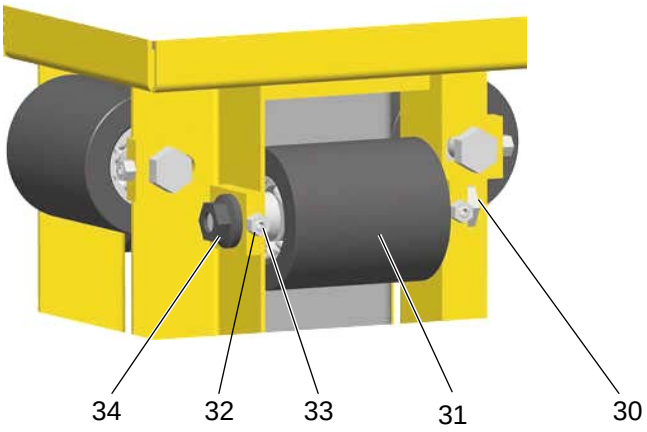
6. Hold the toothed drive wheel (**9**) tight in one hand whilst the eye bolt is being removed from the spindle
7. Remove the drive belt (**3**) from the toothed wheel
8. Remove the toothed drive wheel (**9**) and replace it

The installation takes place exactly in the reverse order!

- If necessary, remove the service cover on the base (**1**), to check if the drive belt (**3**) is sitting correctly on the toothed drive wheel
- Let the Z carriage slowly run up and down the column a few times, to see if the drive belt must be tensioned more

Z carriage - rollers

If the Z carriage (**10**) starts to vibrate excessively during operation, especially at the reversing points, in most cases the cause lies in too much play in the carriage rollers, or even loose rollers!



Z carriage - rollers

In this case, proceed as follows:

1. Release the motor brake (**12**) manually, let the Z carriage (**10**) move down onto the lower stop
2. Switch off the electric power
3. Remove the boarding (front and side panels)
4. Loosen the lock nut (**32**) on the grub screw (**33**)
5. Loosen the nut (**34**) on the roller axle bolt (**30**)

Warning:
Never loosen more than one roller at the same time! Adjust only one roller after another!

6. Adjust the roller pressure with the grub screw, in such a way that the roller (**31**) can just be turned by hand
7. Tighten the roller axle bolt (**30**) and the nut (**34**)
8. Tighten the grub screw (**33**) and secure it
9. Fit the panels again and fasten them firmly

The Z carriage should run evenly and quietly again!

Decommissioning, storage

Introduction

Safety rules

Before lifting a reciprocator off of its horizontal axes, it must be secured from falling over with a lifting device such as a crane, fork lift, etc. The point of attachment is the eye bolt (**A**) at the top of the reciprocator.

ZA05 Reciprocator - top view

Requirements on personnel carrying out the work

All work should be carried out only by authorized technical personnel.

Storage conditions

Type of storage

For safety reasons, reciprocators should only be stored in a horizontal position.

Storage duration

If the physical conditions are maintained, the unit can be stored indefinitely.

Space requirements

The space requirements correspond to the sizes of the axes of motion.

The load-bearing capacity of the floor should be at least 200 kg/m².

There are no special requirements concerning distance to neighboring equipment.

Physical requirements

Storage must be inside a dry building at a temperature between 5-50 °C.

Hazard notes

There is no danger to personnel or the environment if the unit is stored properly.

Shut-down

Decommissioning

Before starting any kind of work, the axes of motion must be disconnected from the power supply:

- Unplug the power cable
- Unplug the ground cable

Cleaning

The running surfaces of reciprocators must be thoroughly cleaned.

Preservation

The cleaned running surfaces of the column on reciprocators must be preserved with a suitable corrosion inhibitor (oiled).

Maintenance during storage

Maintenance schedule

No maintenance schedule is necessary.

Maintenance works

During long-term storage, periodically perform a visual check for corrosion.

Packing, transport

Introduction

This chapter describes special precautions that must be taken during internal transport of the product if:

- the customer himself must pack, transport and ship the product, such as to have renovations or service work carried out by the manufacturer

or

- the product must be shipped for disposal (recycling).

Requirements on personnel carrying out the work

All work must be carried out by personnel trained in packing machines.

Packing material

Selection of packing material

Suitably stable wood packing material must be used.

Procedure when packing

Transport the unit only in a horizontal position.

Reciprocators with a stroke length of more than 1800 mm must be supported in the center of the column.

Transport

Data concerning goods to be transported

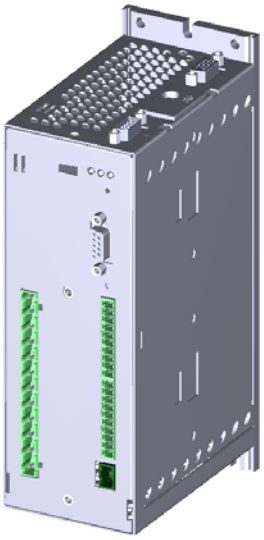
The space requirements correspond to the size of the axes of motion plus the packaging.

Loading, transferring the load, unloading

At least one fork lift must be available.

Power unit

CDB position regulator with CAN BUS



CDB position regulator with CAN BUS

X1	Load connections (mains voltage, motor)	X4	RS 232 Interface
X2	Control connection	X5	not used
X3	Motor winding temperature monitoring (optional)	X7	Incremental pulse generator connection
		S3	CAN address

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description *of* each spare part

Example:

- **Type** ZA05
  Serial number 1234 5678
- Order no. 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this bulk stock is always marked with an *****.

Wearing parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)

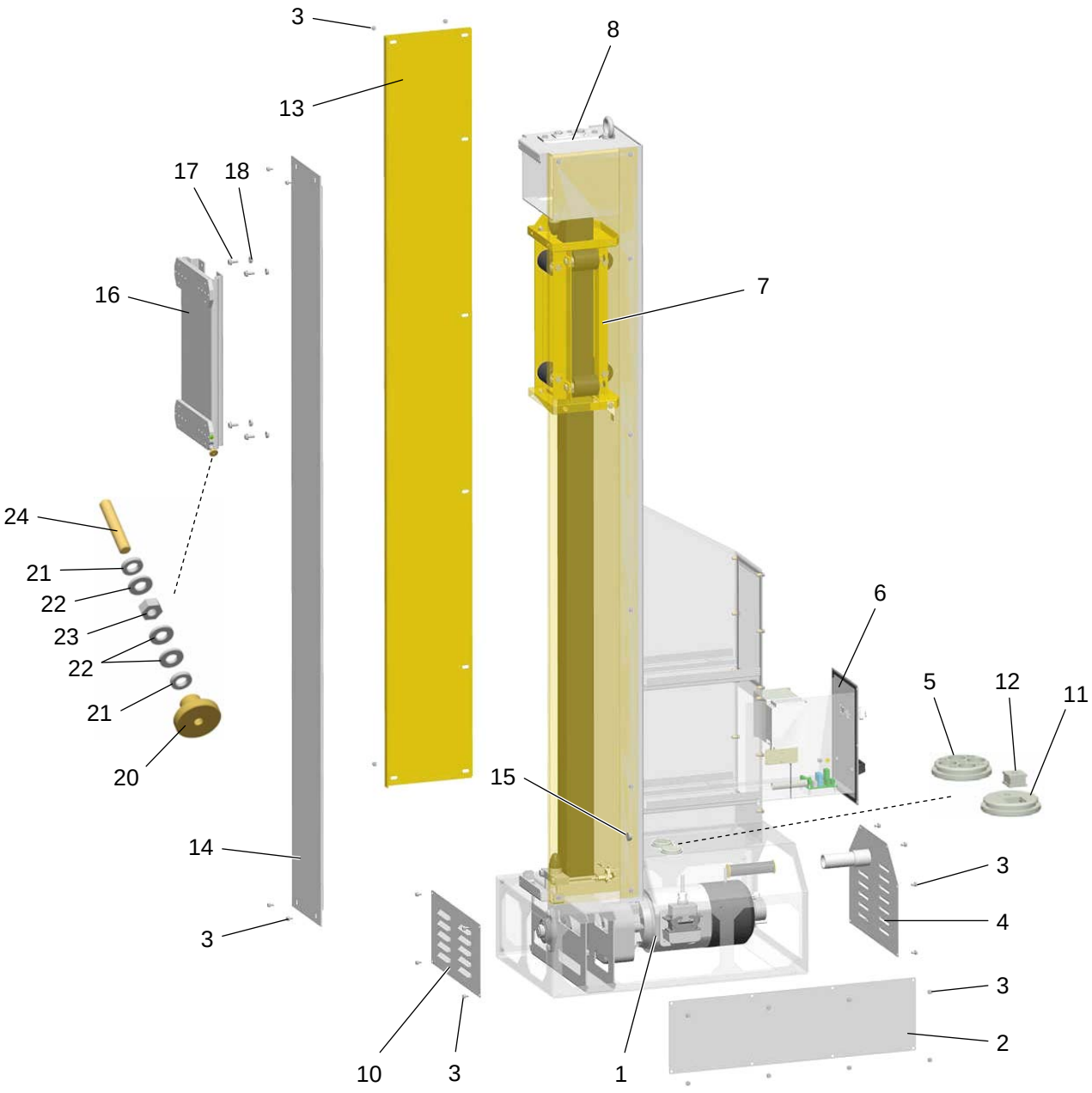
Warning!
Only original Gema spare parts should be used, because the explosion protection will also be preserved that way. The use of spare parts from other manufacturers will invalidate the Gema guarantee conditions!

ZA05 Reciprocator - spare parts list

1	Drive unit - complete, see corresponding spare parts list	
2	Service cover MA	1004 016
3	Hexagon screw - M6x10 mm	1001 081
4	Service cover MS	1004 015
5	Cable feed-through - Ø 50 mm, 5+4	1004 006
6	Electrical module, see "ZA05 Reciprocator - Electrical module"	
7	Z carriage - complete, see "ZA05 Reciprocator - Z carriage (complete)"	
8	Toothed drive wheel, see "ZA05 Reciprocator - Toothed drive wheel"	
10	Service cover SS	1004 017
11	Cable feed-through - Ø 50 mm, double	1004 007
12	Cable grommet QT6	1004 531
13	Panel - lateral	
	ZA05-13	386 502
	ZA05-18	386 510
	ZA05-23	386 529
	ZA05-28	386 537
	ZA05-33/38	1004 454*****
14	Panel - front	
	ZA05-13	1004 011
	ZA05-18	1004 012
	ZA05-23	1004 013
	ZA05-28	1004 014
	ZA05-33/38	1004 455*****
15	Cable gland for the cable feed-through	1003 578
16	Gun holder plate - complete	386 693
	Gun holder plate - special (not shown)	1004 453
	Spacer (not shown)	1004 456
17	Hexagon shakeproof screw - M8x20 mm	244 422
18	Hexagon shakeproof nut - M8	244 449
20	Milled nut - M6, brass	200 433
21	Shake proof washer - A-type, M6	200 450
22	Washer - Ø 6.4/12.5x1.6 mm, brass	200 476
23	Hexagon nut - M6, brass	200 417
24	Threaded rod - M6x35 mm	389 838

***** Please indicate length

ZA05 Reciprocator - spare parts



ZA05 Reciprocator - spare parts

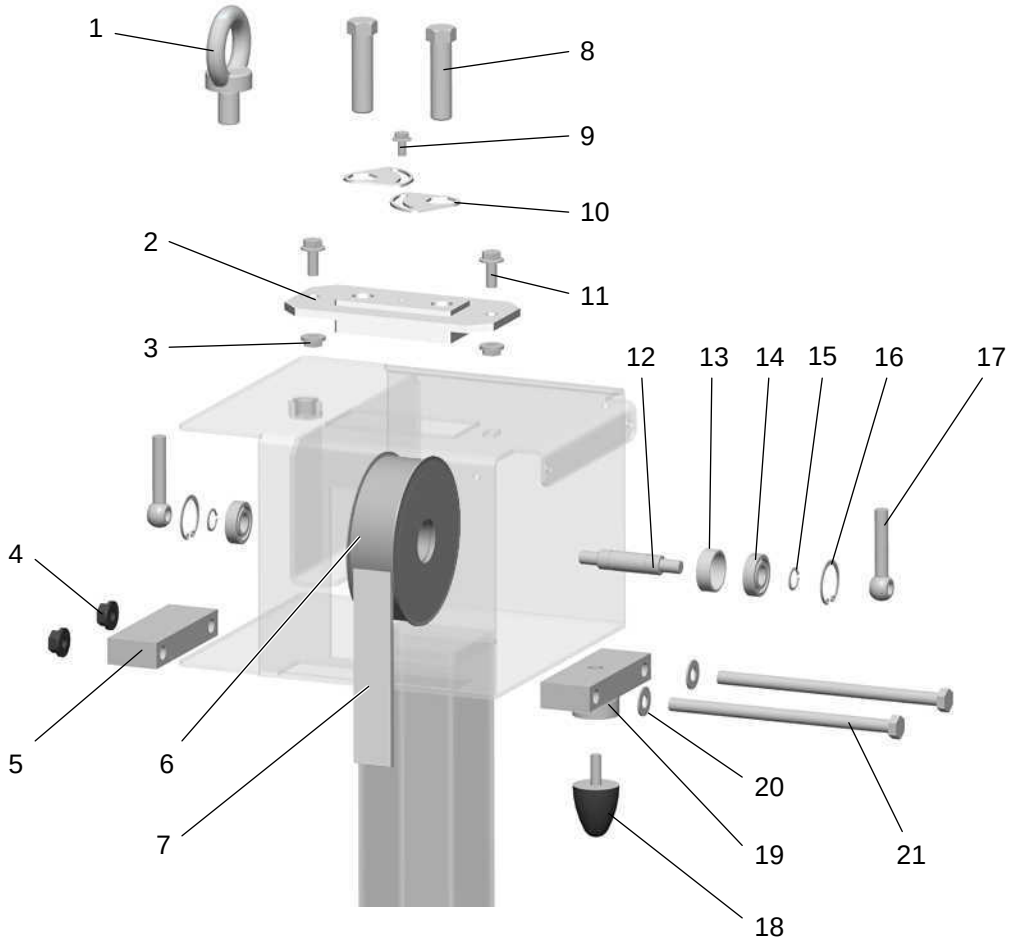
ZA05 Reciprocator - toothed drive wheel

1	Eye bolt - M16	264 415
2	Guide plate	386 588
3	Hexagon shakeproof nut - M8	244 449
4	Hexagon ribbed nut - M10	234 656
5	Counter profile - 40/20x115 mm	386 774
6	Drive wheel	386 600
7	Drive belt	103 730#*
	ZA05-13 - L=4215 mm	
	ZA05-18 - L=5215 mm	
	ZA05-23 - L=6215 mm	
	ZA05-28 - L=7215 mm	
8	Tensioning screw	386 596
9	Hexagon shakeproof screw - M6x12 mm	244 406
10	Locking plate	386 634
11	Hexagon shakeproof screw - M8x20 mm	244 422
12	Toothed drive wheel spindle	386 766
13	Spacer ring - Ø 31.9/28x11 mm	386 618
14	Deep groove ball bearing - Ø 15/32x9 mm	241 709
15	Snap ring - A-15	233 617
16	Snap ring - I-32	245 780
17	Eye bolt - M10x60 mm	264 202
18	Rubber buffer - Ø 35x40 mm, M8/A	211 664
19	Stop plate	386 782
20	Ribbed washer - M10	237 981
21	Hexagon screw - M10x180 mm	201 855

***** Please indicate length

Wearing part

ZA05 Reciprocator - toothed drive wheel

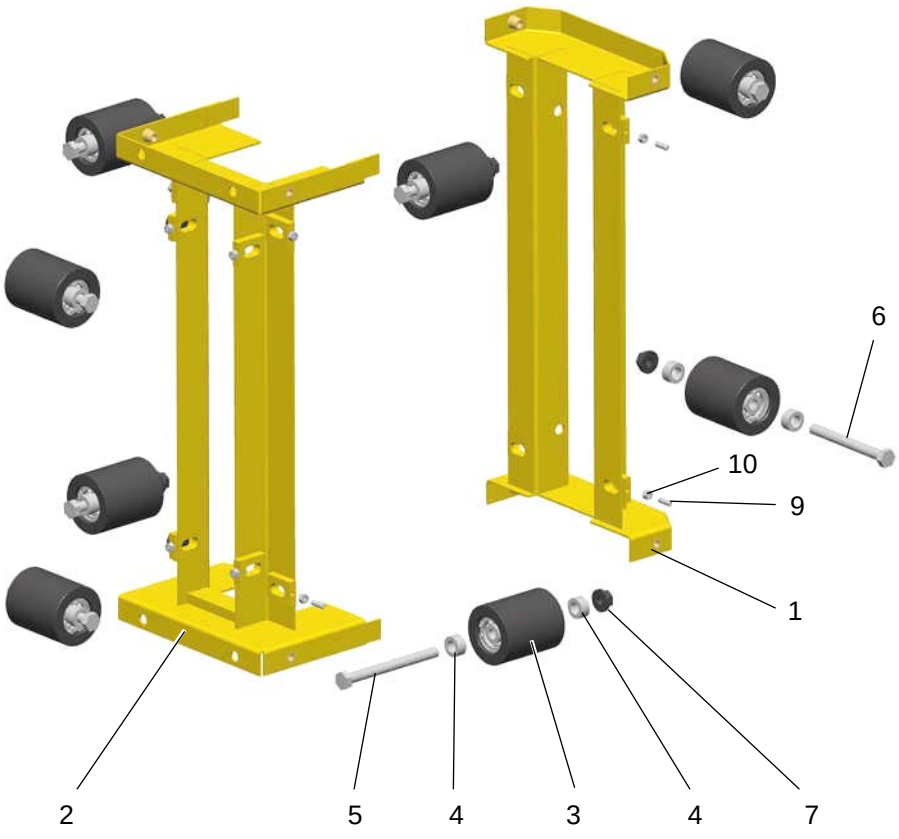


ZA05 Reciprocator - toothed drive wheel

ZA05 Reciprocator - Z carriage (complete)

1	Carriage - fixed side (without pos. 9, 10)	386 677
2	Carriage - adjustable side (without pos. 9, 10)	386 685
3	Roller - complete	307 165#
4	Spacer sleeve	308 013
5	Hexagon screw - M10x110 mm	214 221
6	Hexagon screw - M10x100 mm	214 213
7	Hexagon ribbed nut - M10, black	234 656
9	Hexagon grub screw - M5x16 mm	237 744
10	Hexagon nut - M5	205 150

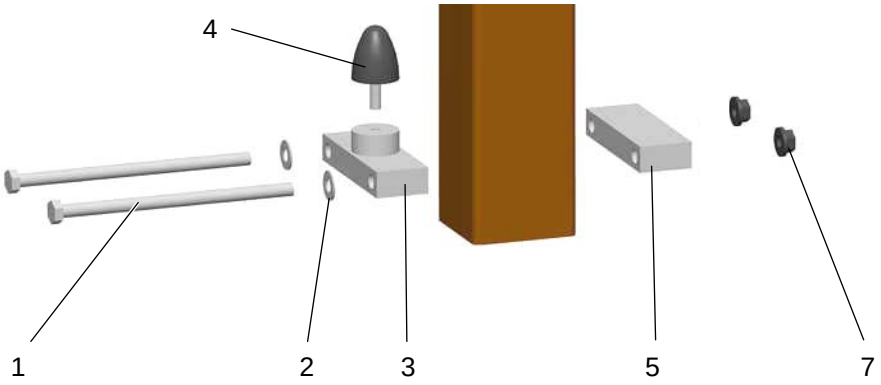
Wearing part



ZA05 Reciprocator - Z carriage (complete)

ZA05 Reciprocator - Rubber buffer

1	Hexagon screw - M10x180 mm	201 855
2	Ribbed washer - M10	237 981
3	Stop plate	386 782
4	Rubber buffer - Ø 35x40 mm, M8/A	211 664
5	Counter profile - 40/20x115 mm	386 774
7	Hexagon ribbed nut - M10	234 656

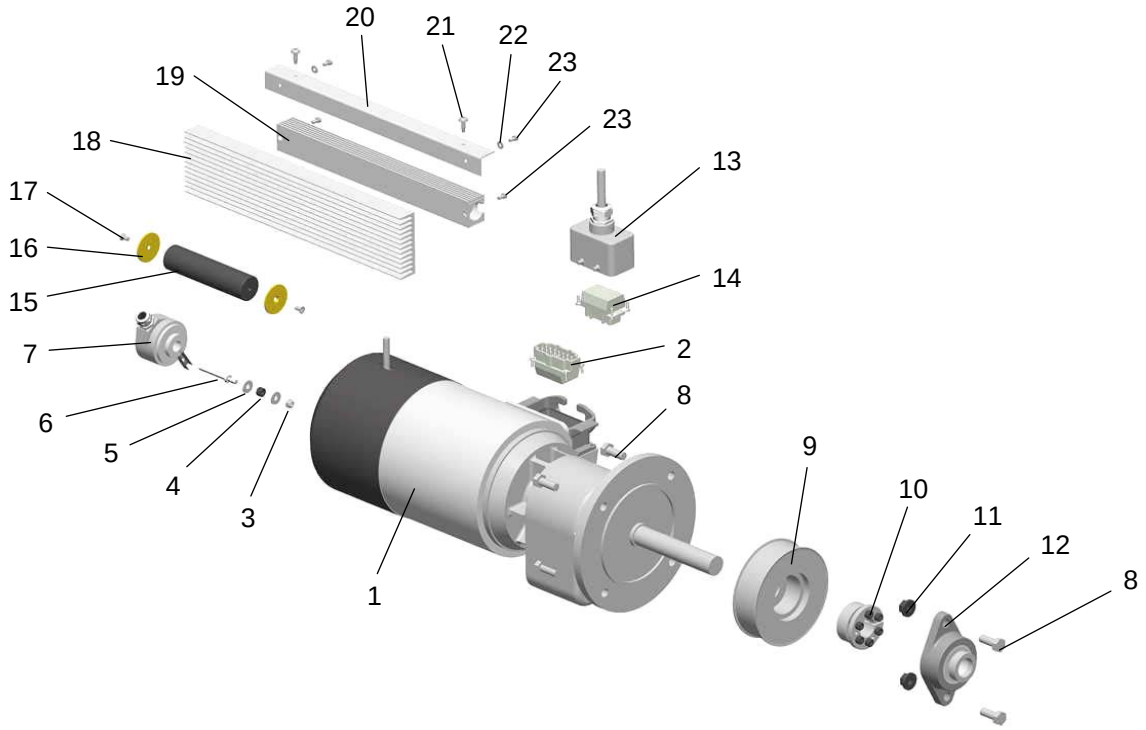


ZA05 Reciprocator - Rubber buffer

ZA05 Reciprocator - drive unit (complete)

1	Motor-gearbox unit - 0.75 W, complete (incl. pos. 1-6)	1004 019
2	Plug insert - 10-P	211 540
3	Locknut - M6	1003 822
4	Cable bush - ID 5 mm	1003 821
5	Washer - Ø 6.4/16x1.6 mm	215 805
6	Torque support - Ø 6/M6	1003 819
7	Pulse generator	268 925
8	Hexagon screw - M10x25 mm	214 116
9	Toothed drive belt wheel	368 610
10	Clamping set - Ø 25/50x22 mm	264 199
11	Hexagon ribbed nut - M10	234 656
12	Flange bearing - Ø 25 mm	264 210
13	Motor-/brake cable ZA…	1004 018
14	Socket insert - 10-P	211 532
15	Switch lever	386 456
16	Washer	386 464
17	Countersunk-head screw - M5x10 mm	214 671
18	Heat sink	386 740
19	Brake resistor - 100 Ohm/400 W	264 172
20	Heat sink holder	1003 978
21	Cap screw - 50x16 mm	1002 965
22	Ribbed washer - M4	264 822
23	Cylinder Allan screw - M4x8 mm	216 259

ZA05 Reciprocator - Drive unit

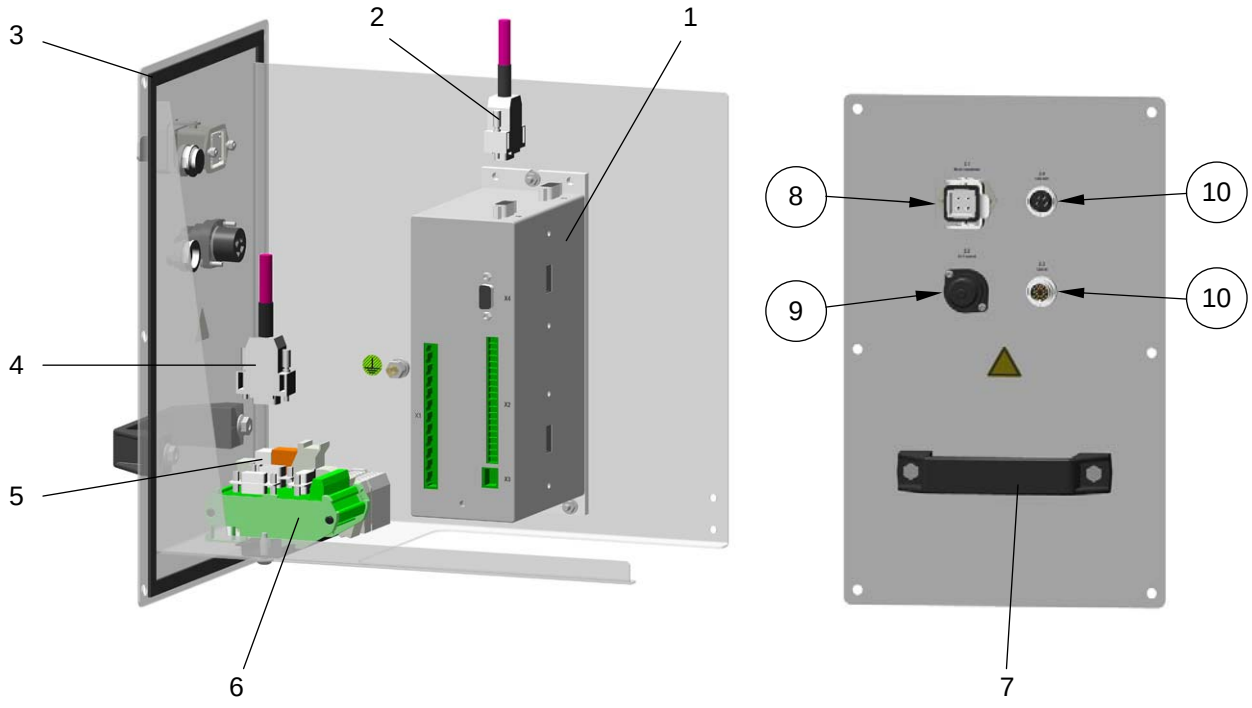


ZA05 Reciprocator - drive unit (complete)

ZA05 Reciprocator - Electrical module

1	Position regulator CDB-ZA05 (please indicate the axis serial number - see Rating plate)	1003 988
2	CAN bus cable – 0.55 m	386 995
3	Adhesive seal strip - 9x2 mm	100 250*
4	CAN bus cable – 1.0 m	391 620
5	Relay – 24 VDC/2 W	269 700
6	CAN T-distribution box	265 772
7	Grip	244 864
8	Mains cable – 20 m (not shown)	1004 113
9	Signal cable 24 V Control – 20 m (not shown)	1008 431
10	Signal cable CAN bus – 20 m (not shown)	389 560
	CAN bus terminal plug (not shown)	387 606
	Protection cap (not shown)	265 446

***** Please indicate length



ZA05 Reciprocator - Electrical module

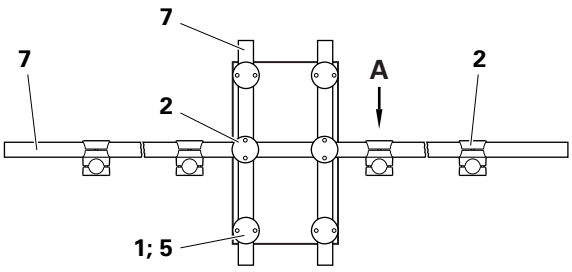
ZA05 Reciprocator - Gun holders

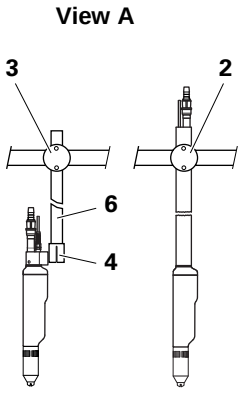
Note: The following examples show a possible configuration of gun holders. Please contact the Gema Service department in the case of special configurations!

Gun holder for 1-4 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see "Gun fixtures and collision protection"	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

***** Please indicate length





Automatic guns

Gun holder for 5-8 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see "Gun fixtures and collision protection"	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
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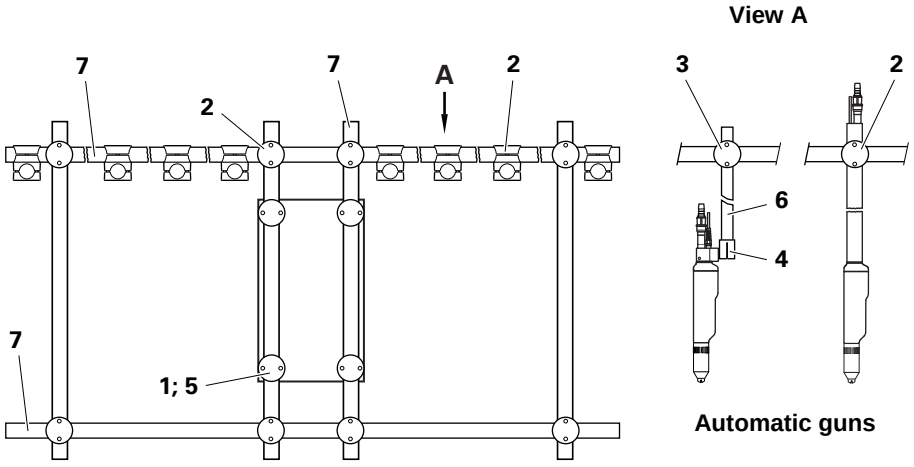
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

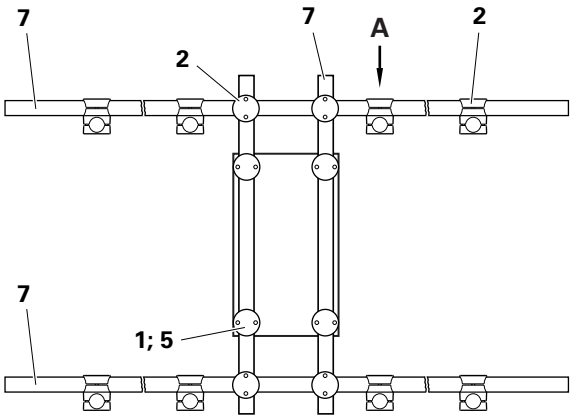
***** Please indicate length



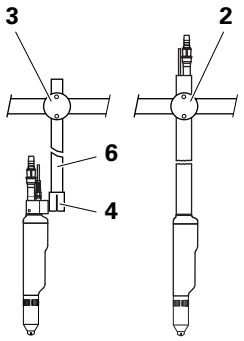
Gun holder for 2x1-4 guns

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see "Gun fixtures and collision protection"	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

***** Please indicate length



View A

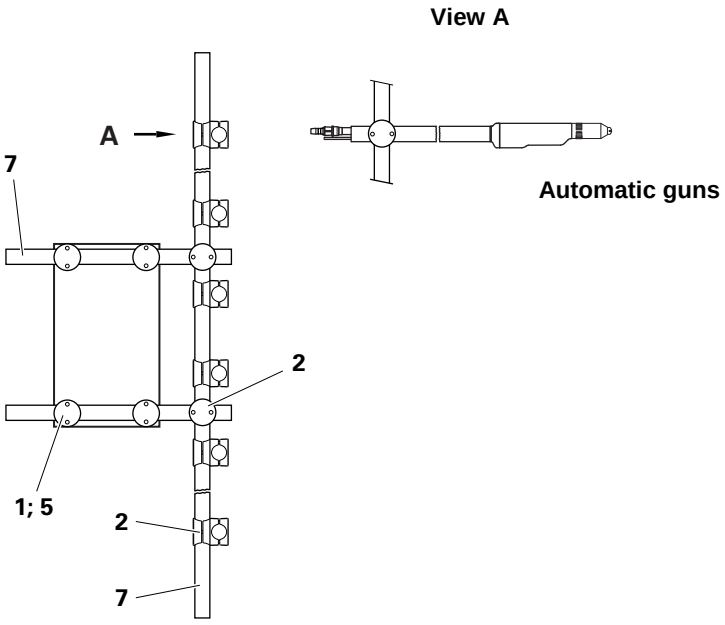


Automatic guns

Vertical gun holder

1	Clamp element-half (order in pairs)	363 987
2	Cross clamping element - Ø 40/40 mm	363 910
3	Cross clamping element - Ø 40/30 mm	363 936
	Cross clamping element - Ø 30/30 mm	363 952
4	see "Gun fixtures and collision protection"	
5	Allen cylinder screw - M8x50 mm	235 113
6	Tube - Ø 30x600 mm	337 528
	Tube - Ø 30x800 mm	337 536
	Tube - Ø 30x1000 mm	337 544
	Tube - Ø 30 mm	103 306*****
6.1	Tube plug - Ø 30 mm, for pos. 6	236 373
7	Tube - Ø 40x600 mm	337 552
	Tube - Ø 40x1000 mm	337 560
	Tube - Ø 40x1500 mm	337 579
	Tube - Ø 40x2000 mm	337 587
	Tube - Ø 40 mm	103 314*****
7.1	Tube plug - Ø 40 mm, for pos. 7	236 381

***** Please indicate length

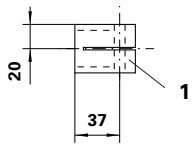


Gun fixtures and collision protection

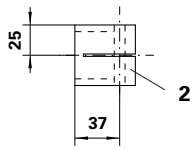
1	Gun fixture - Ø 30 mm	350 150
2	Gun fixture - Ø 39 mm (for plastic tube only)	354 317
2	Gun fixture - Ø 40 mm	1000 507
3	Gun fixture - Ø 40 mm (transverse)	356 670
4	Collision protection - Ø 30 mm (for ZA axis)	364 215
5	Dummy piece - complete, Ø 30 mm (for ZA axis)	364 231
6	Collision protection - Ø 30 mm (for YT axis)	364 223
7	Dummy piece - complete, Ø 30 mm (for YT axis)	364 240

Gun fixtures

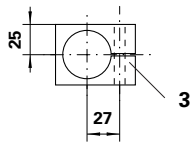
Ø 30



Ø 39/Ø 40

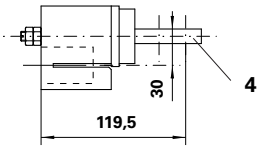


Ø 40

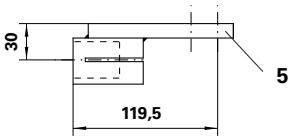


Collision protection

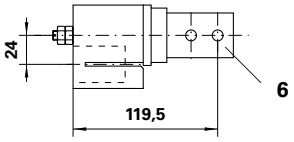
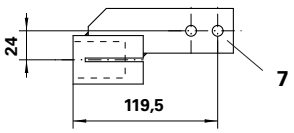
Ø 30



Ø 30



Ø 30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